

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



ALTERA

16

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 :

E04C 3/00, 3/08, E04H 12/18, B66C  
23/68

A1

(11) International Publication Number:

WO 00/53861

(43) International Publication Date: 14 September 2000 (14.09.00)

(21) International Application Number: PCT/NL00/00158

(22) International Filing Date: 9 March 2000 (09.03.00)

(30) Priority Data:

1011491

9 March 1999 (09.03.99)

NL

(71) Applicant (for all designated States except US): MAMMOET  
DECALIFT INTERNATIONAL B.V. [NL/NL]; Munniken-  
heiweg 32, NL-4879 NG Etten Leur (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): STOOF, Pieter, Maria  
[NL/NL]; Rijsbergseweg 545, NL-4835 ED Breda (NL).

(74) Agent: HOORWEG, Petrus, Nicolaas; Arnold & Siedsma,  
Sweelinckplein 1, NL-2517 GK The Hague (NL).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG,  
BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE,  
ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,  
KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,  
MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU,  
SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,  
US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE,  
LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM,  
AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT,  
BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU,  
MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published

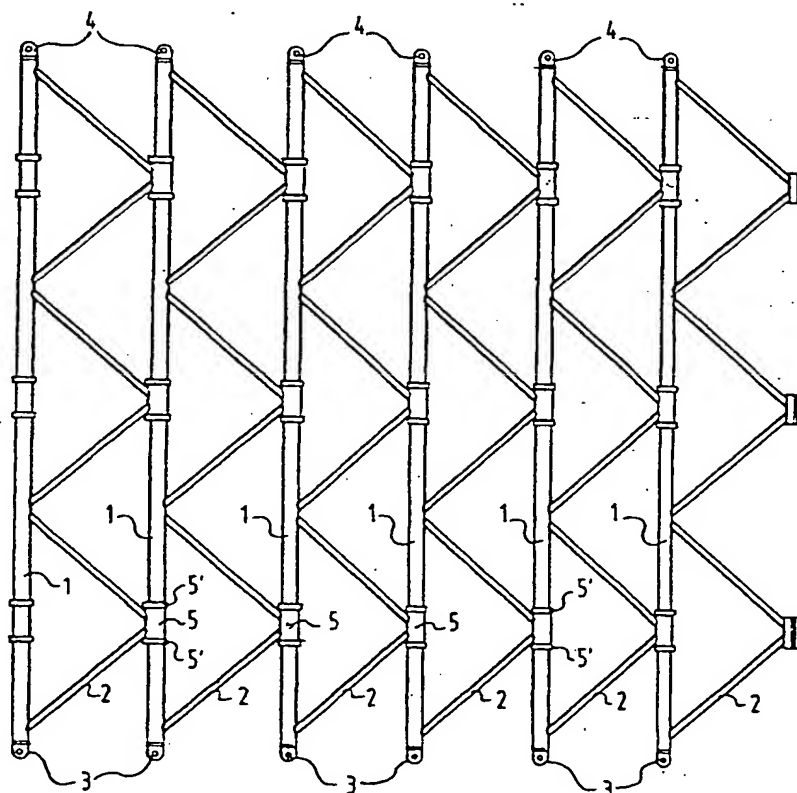
With international search report.

In English translation (filed in Dutch).

(54) Title: FRAME STRUCTURE FOR ASSEMBLING A BOOM, HOISTING OR BUILDER'S CRANE, A BRIDGE OR THE LIKE

(57) Abstract

Structure for assembling a boom, hoisting or builder's crane, bridge or the like, consisting of at least three frame sections of longitudinal and transverse profiles, for instance tubular profiles, wherein the frame sections are coupled to each other for mutual pivoting by means of a pivot member between the transverse profiles of the one section and the longitudinal profiles of the other section, whereby the cross-section can be made smaller for transport purposes by collapsing the spatial structure.



*FOR THE PURPOSES OF INFORMATION ONLY*

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

L	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
M	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
T	Austria	FR	France	LU	Luxembourg	SN	Senegal
U	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
Z	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
A	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
B	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
E	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
F	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
G	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
I	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
J	Brazil	IL	Israel	MW	Malawi	UG	Uganda
K	Belarus	IS	Iceland	MX	Mexico	US	United States of America
L	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
M	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
N	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
O	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
P	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
Q	Cameroon	KR	Republic of Korea	PT	Portugal		
R	China	KZ	Kazakhstan	RO	Romania		
S	Cuba	LC	Saint Lucia	RU	Russian Federation		
T	Czech Republic	LI	Liechtenstein	SD	Sudan		
U	Germany	LK	Sri Lanka	SE	Sweden		
V	Denmark	LR	Liberia	SG	Singapore		
W	Estonia						

FRAME STRUCTURE FOR ASSEMBLING A BOOM, HOISTING OR  
BUILDER'S CRANE, A BRIDGE OR THE LIKE

The invention relates to a structure for assembling a boom, hoisting or builder's crane, bridge or the like, consisting of at least three frame sections of longitudinal and transverse profiles, for instance  
5 tubular profiles.

According to the standard frame technique the booms or hoisting cranes consist of welded frame structures of a fixed cross-section. Where long structural components are concerned, these long booms can be sub-divided in  
10 length-direction into shorter pieces which have to be mutually coupled. Although these pieces are transportable, the large cross-section remains a problem, on the one hand one of large volume during transport and on the other one of limiting the cross-  
15 section in respect of the permissible height and width of normal road transport, whereby a limitation of the boom strength is determined.

The invention has for its object to obviate the above stated drawbacks and provides for this purpose a  
20 frame structure which is distinguished in that the frame sections are coupled to each other for mutual pivoting by means of a pivot member between the transverse profiles of the one section and the longitudinal profiles of the other section.

25 Owing to the pivot construction between the frame sections it is possible to make the cross-section of a hoisting boom smaller during transport. Not only can the transport volume be hereby reduced to about a quarter or less of the operational cross-section, but the invention  
30 also makes it possible to make very many boom cross-sections from basic side sections, depending on the desired boom strength. By forming the cross-section of the boom as a random polygon of for instance triangle to dodecagon or any other random prism, the cross-section  
35 can be made larger than the permissible transport cross-section.

The collapsible frame structure is also important when the required transport and construction time is

greater than the hoisting operation time. There is moreover less risk of damage during transport.

The invention is further elucidated in the figure description hereinbelow with reference to a drawing. In  
5 the drawing:

fig. 1 shows a top view of a spread structure of side walls for a hexagonal boom part,

fig. 2 shows a front view of the collapsed side walls of the hexagonal boom part of fig. 1,

10 fig. 3 shows a cross-section of the hexagonal boom part of fig. 1 in the operational situation,

fig. 4 is a front view of the spread frame structure of fig. 1,

15 fig. 5a-5d show a front view of a triangular boom part, respectively in collapsed situation, respectively in spread position in top view,

fig. 6a-c show a front view of a square boom part, respectively in collapsed situation, respectively in spread position in top view,

20 fig. 7 shows a front view of a hexagonal boom part, respectively in collapsed situation, respectively in spread position in top view,

fig. 8 shows a front view of an octagonal boom part, respectively in collapsed situation, respectively  
25 in spread position in top view,

fig. 9 shows a front view of a dodecagonal boom part, respectively in collapsed situation, respectively in spread position in top view,

30 fig. 10 shows an embodiment of a boom part with a hexagonal cross-section which has greater torsional stiffness than that of fig. 7.

The boom part shown schematically in fig. 1 consists of six practically identical boom side sections, each consisting of a longitudinal profile 1, each of which is provided with an even number of  
35 transverse profiles 2. On the end of each longitudinal profile 1 is situated a connecting member 3, 4 so that a number of boom parts can be connected to each other mutually in line so as to obtain a longer structural  
40 part.

The frame sections are mutually connected with pivots 5, for which purpose each pivot is embodied as a tubular sleeve which is welded to two transverse profiles 2 at each position where these come together, and which tubular sleeve 5 is rotatable round the adjacent longitudinal profile and is enclosed by flanges 5' so that the tubular sleeve cannot slide along the profile.

Each tubular sleeve 5 can be divided and consist of two half-shells for mutual connection, see on the right in fig. 4, such that assembly of the frame structure is considerably simplified and wherein the number of sections can be increased and the cross-section therefore enlarged, compare fig. 3 to fig. 9.

Inside the assembled spatial structure can be arranged transverse connecting profiles 6 which are connected to the longitudinal profiles 1 and herein cross over one or more other longitudinal profiles 1, thus creating cross-sectionally triangular, statically stable transverse profiles.

Fig. 5 shows a frame structure with three sections which form a triangle in cross-section. Fig. 6 shows four sections which form a square. Fig. 8 shows an octagon consisting of two structural parts 6c, while fig. 9 shows a dodecagonal frame boom consisting of two hexagons as according to fig. 7.

Fig. 10 shows a boom construction with torsional stiffness, wherein the transverse profiles come to lie mutually in line. The longitudinal profiles are mutually shifted half a pitch for this purpose.

The dimensions of the side sections are preferably such that in the collapsed position they fit into a normal container of 6 or 12 metres, whereby particularly transport over water can take place more compactly in safer and simpler manner.

As elucidated above, the invention enables the assembly from a series of standard side sections of a random strong and high boom, hoisting crane or bridge with a cross-section which in the known art cannot be transported by road.

## CLAIMS

1. Structure for assembling a boom, hoisting or builder's crane, bridge or the like, consisting of at least three frame sections of longitudinal and transverse profiles, for instance tubular profiles, characterized in that the frame sections are coupled to each other for mutual pivoting by means of a pivot member between the transverse profiles of the one section and the longitudinal profiles of the other section.
2. Frame structure as claimed in claim 1, characterized in that the pivot member is formed by a tubular sleeve which is fixedly connected to one or two transverse profiles and which is rotatable in non-slidable manner round a longitudinal profile.
3. Frame structure as claimed in claim 1 and/or 2, characterized in that each longitudinal profile of a boom part is provided on the end thereof with a connecting means in order to enable mutual connection of the structural parts in longitudinal direction.
4. Frame structure as claimed in any of the foregoing claims, characterized in that a transverse connecting profile is arranged between two longitudinal profiles such that the transverse profile crosses over at least one intermediate longitudinal profile to form a triangular, statically stable cross-section.

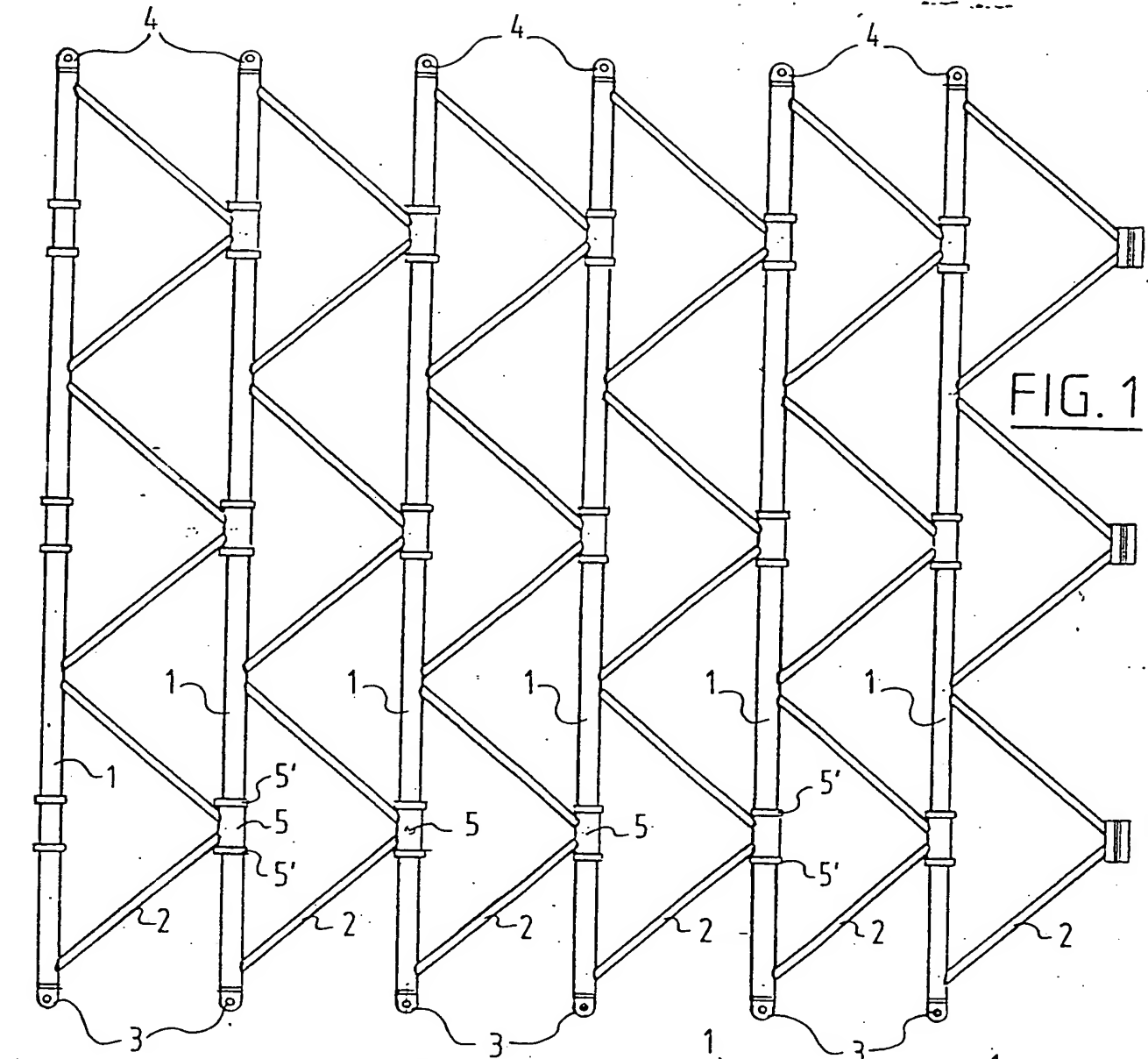


FIG. 1

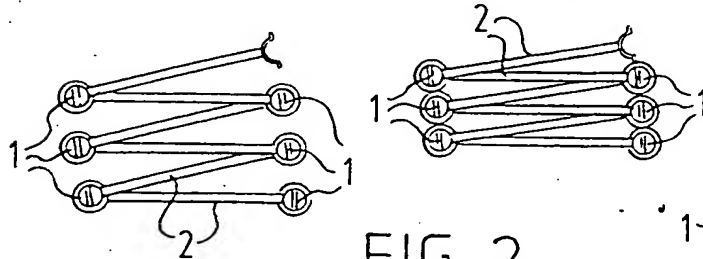


FIG. 2

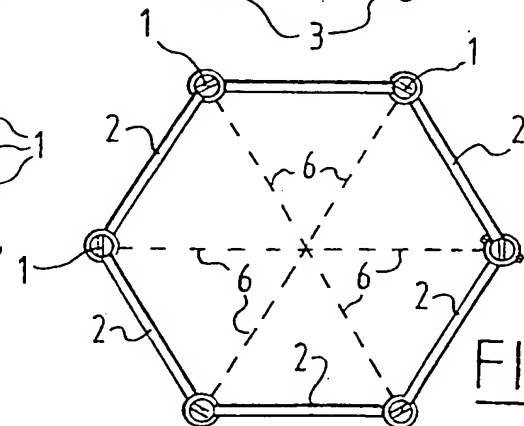


FIG. 3

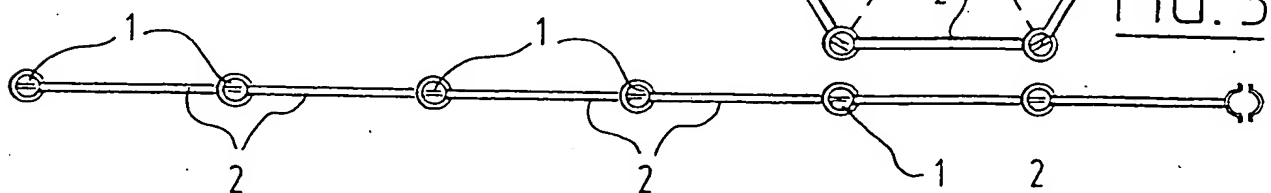
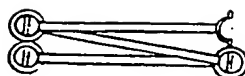
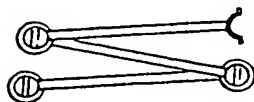
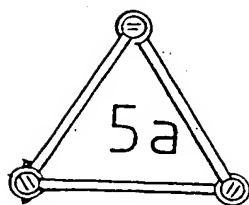


FIG. 4

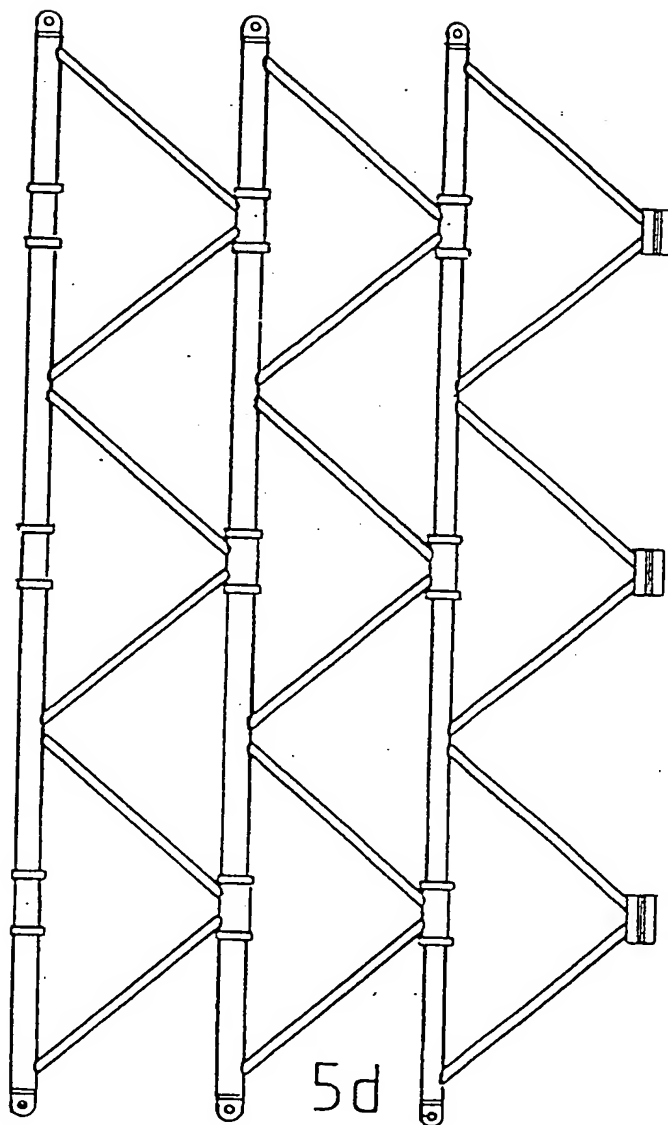
2/7



5b

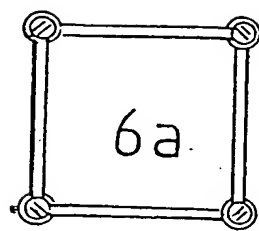
5c

FIG. 5



5d



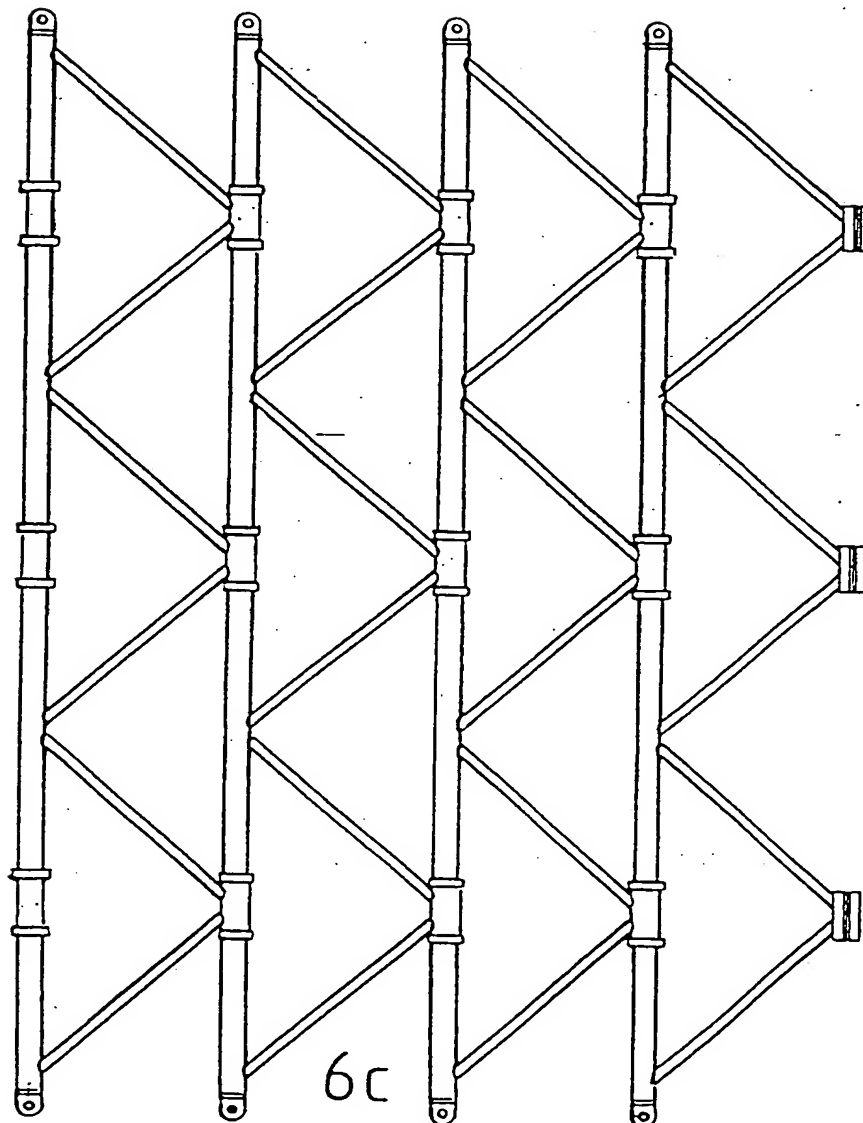


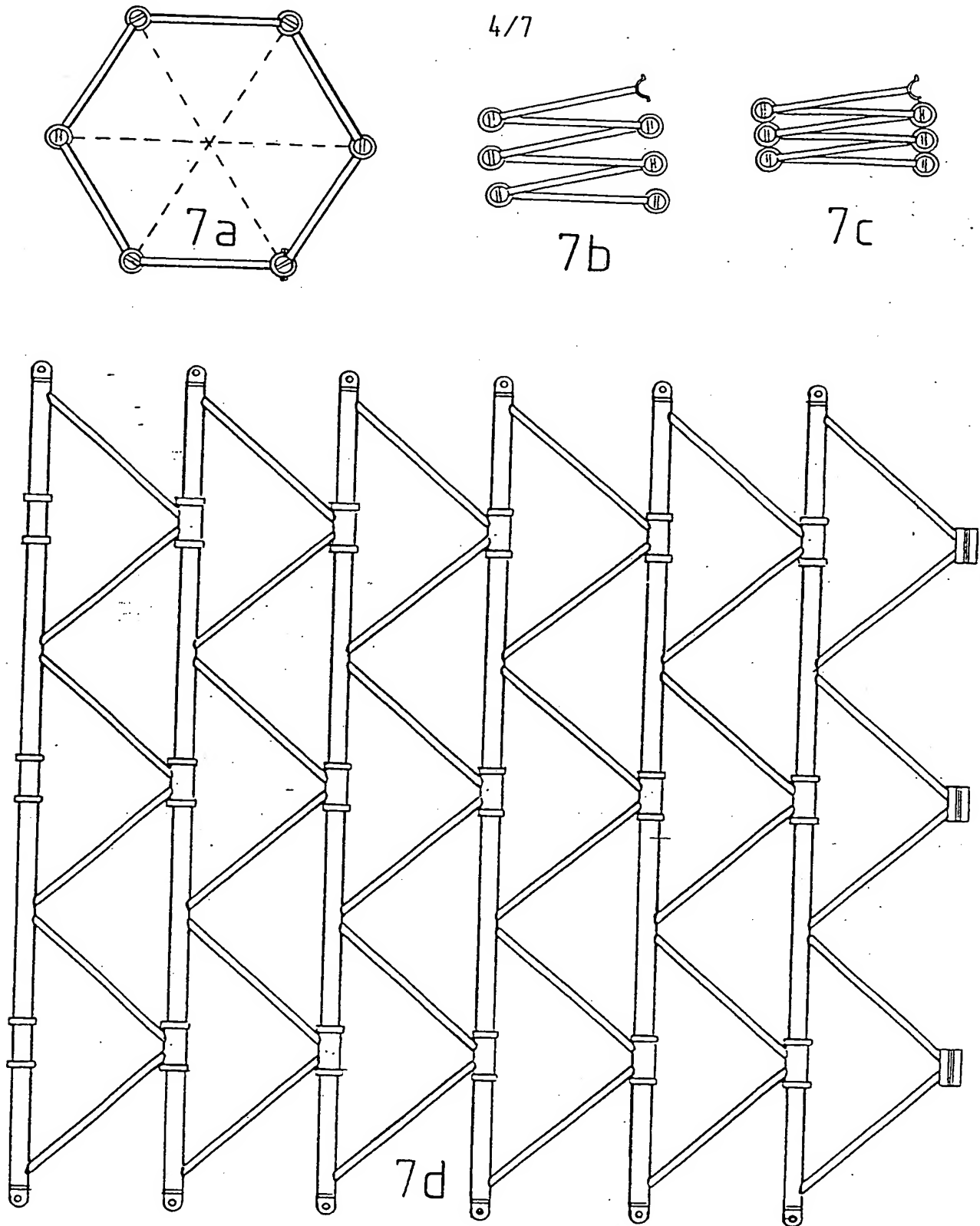
3/7

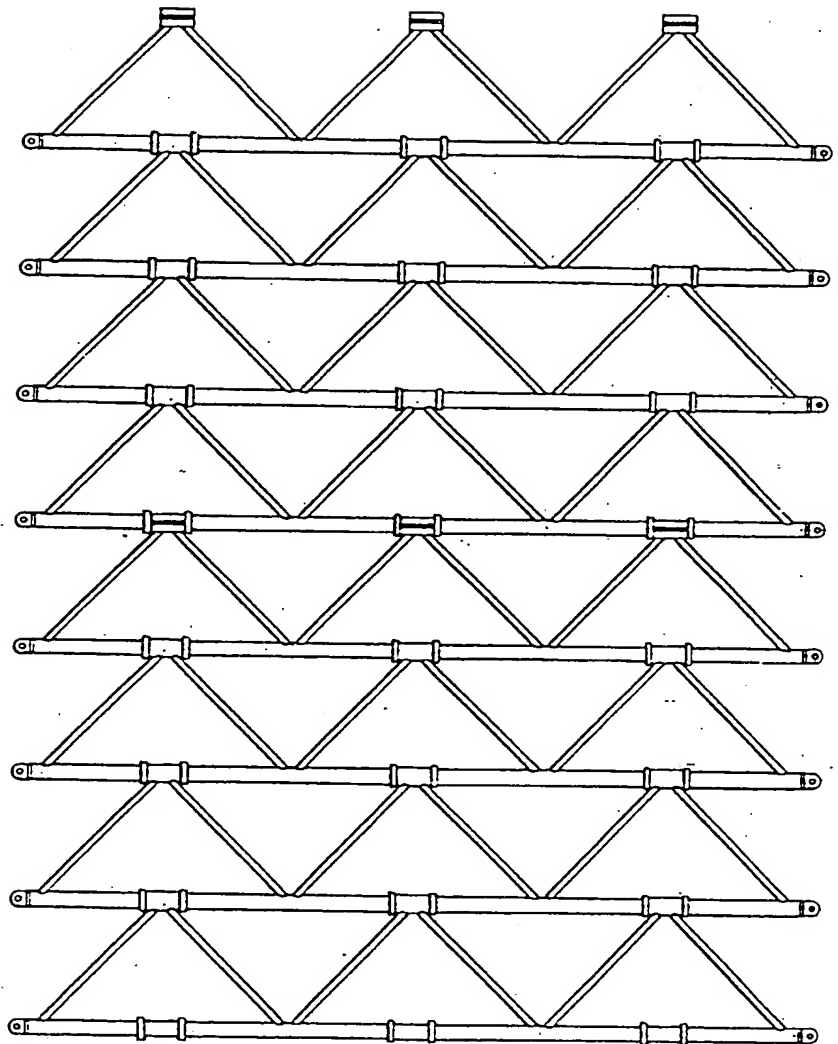
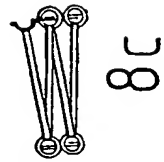
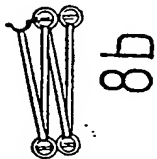
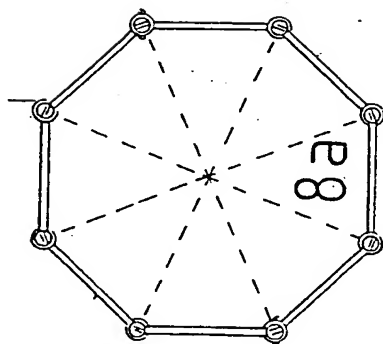


6b

FIG. 6

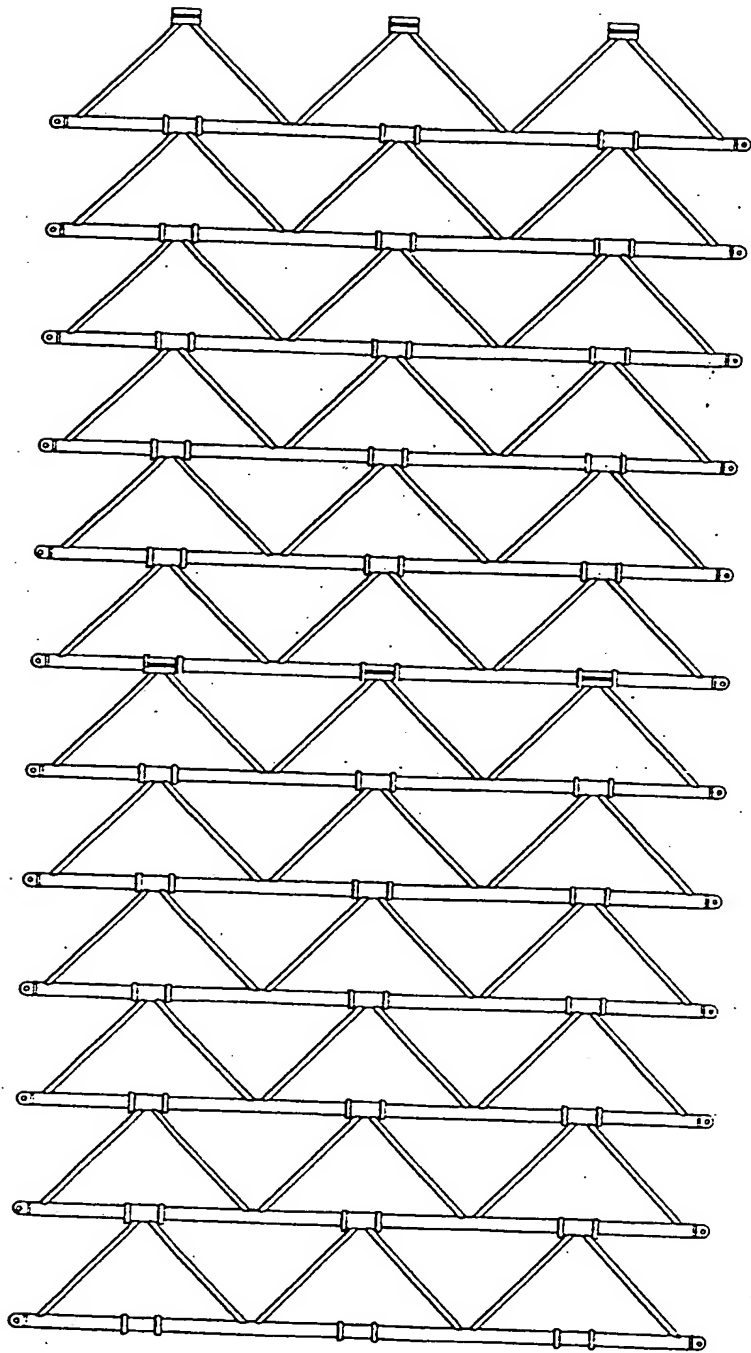
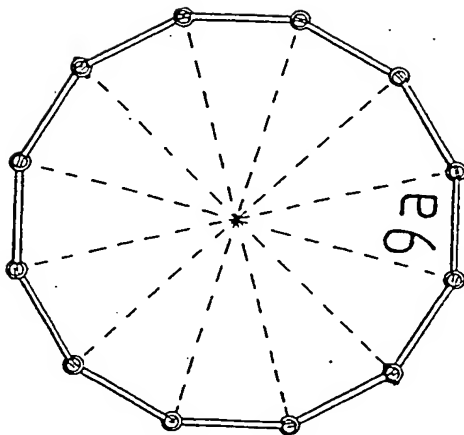






6/7

FIG. 9



7/7

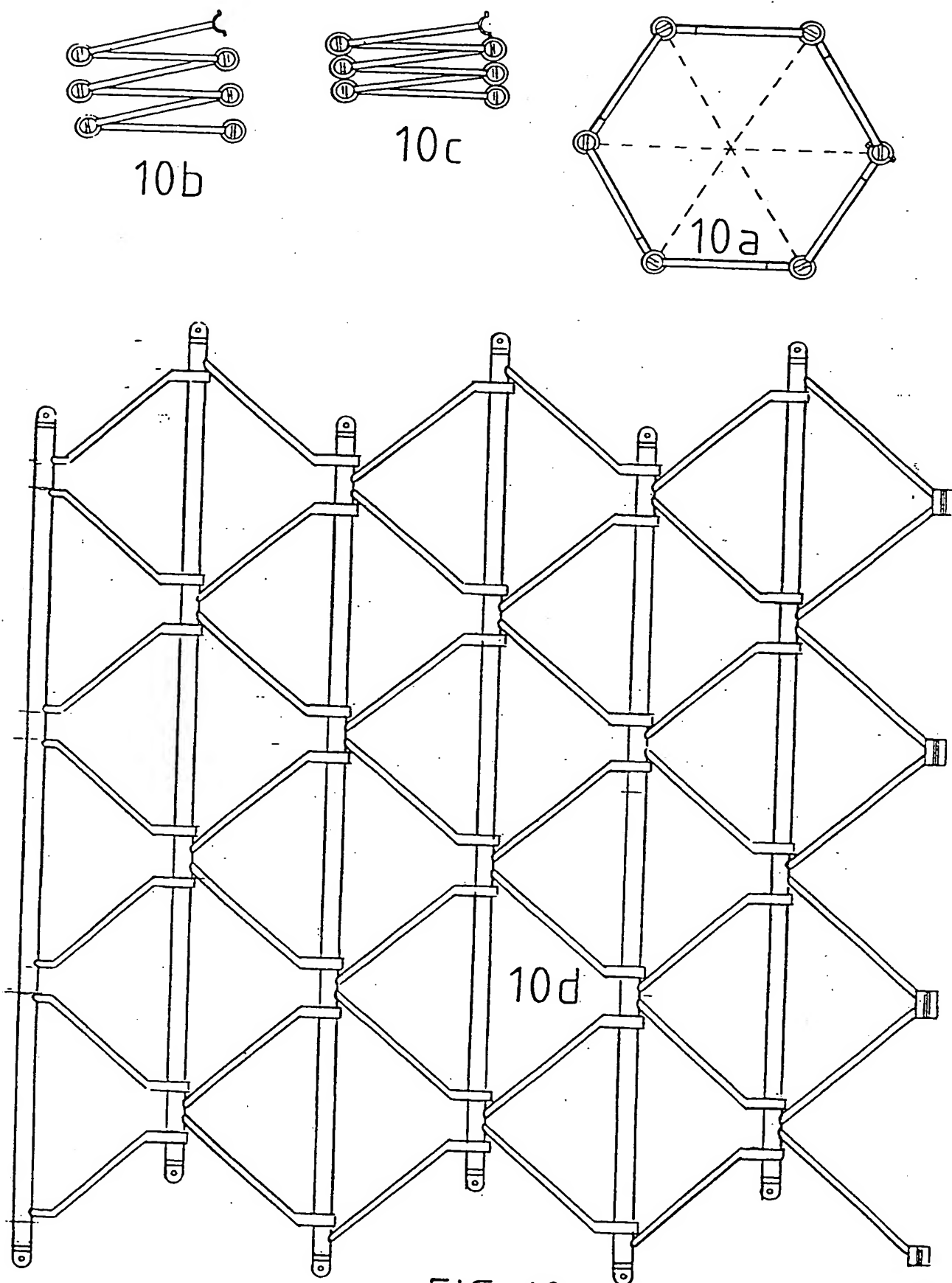


FIG. 10

# INTERNATIONAL SEARCH REPORT

Intern Application No  
PCT/NL 00/00158...

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E04C3/00 E04C3/08 E04H12/18 B66C23/68

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E04C E04H E01D B66C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 822 945 A (MULLER ROY) 20 October 1998 (1998-10-20) column 2, line 56 -column 3, line 50 column 4, line 19 -column 4, line 28 column 5, line 4 -column 5, line 33 column 6, line 10 -column 6, line 21 figures 1-5,7-9	1-4
X	FR 1 294 033 A (JAUREGUI) 19 October 1962 (1962-10-19)	1
Y	page 3, column 1, paragraph 7 -page 3, column 2, paragraph 1 page 3, column 2, paragraph 6 -page 4, column 1, paragraph 2 figures 6-9,11,13	2
	--- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

31 May 2000

Date of mailing of the international search report

08/06/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3018

Authorized officer

Hendrickx, X

# INTERNATIONAL SEARCH REPORT

Intern: Application No  
PCT/NL 00/00158

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
------------	--	-----------------------

Y	<p>WO 93 20306 A (STRAND GUNNAR)            14 October 1993 (1993-10-14)            page 11, line 1 -page 11, line 28            figures 7-9</p> <p>-----</p>	2
---	---	---

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern. Application No

PCT/NL 00/00158

Patent document  
cited in search report

Publication  
date

Patent family  
member(s)

Publication  
date

US 5822945 A

20-10-1998

NONE

FR 1294033 A

19-10-1962

NONE

WO 9320306 A

14-10-1993

NO  
EP

175270 B  
0633970 A

13-06-1994  
18-01-1995